NOAA in the Monterey Bay Watershed

- **Monterey Bay National Marine Sanctuary**
  Supporting one of the world's most diverse marine ecosystems, the Monterey Bay National Marine Sanctuary is home to numerous mammals, seabirds, fishes, invertebrates and plants in a remarkably productive coastal environment. The MBNMS was established for the purpose of resource protection, research, education, and public use of this national treasure. For more information, please visit the website at: http://www.mbnms.nos.noaa.gov.

- **MERITO (Multicultural Education for Resource Issues Threatening Oceans)**
  MERITO is a marine conservation outreach effort comprising approximately twenty-five regional groups that participate in ocean and watershed education programs that serve students, teachers, adults and families living near the Monterey Bay National Marine Sanctuary (MBNMS). The three main programs of MERITO are site-based education, community-based education, and minority-serving education. For more information, visit the website at: http://www.mbnms.nos.noaa.gov/educate/merito/welcome.html or contact Karen Grimmer at 831-647-4201.

- **LiMPETS (Long-term Monitoring Program & Experiential Training for Students)**
  LiMPETS is for middle school, high school, and other volunteer groups to monitor the rocky intertidal, sandy shore and offshore areas of the five west coast National Marine Sanctuaries (Olympic Coast, Cordell Bank, Gulf of the Farallones, Monterey Bay and Channel Islands). The Sanctuaries and partners are establishing a rigorous program to monitor the abundance and distribution of major intertidal biota. For more information, visit the website at: http://limpets.noaa.gov/ or contact Lisa Emanuelson at 831-647-4201.

- **Citizen Watershed Monitoring Network**
  Volunteers conduct visual assessments of their watersheds, measure water quality parameters, conduct bird surveys, and measure flow and sediment issues and objectives. The Network offers training, establishes sampling protocols, lends equipment and provides a centralized database access for the volunteers. For more information, visit the website at: http://www.mbnms.nos.noaa.gov/monitoringnetwork/about_us.html or contact Bridget Hoover at 831-883-9303.

- **Water Quality Program**
  Coastal watersheds immediately adjacent to the Sanctuary cover over 7000 square miles of land with a mix of land uses including major urban areas, rural communities, agricultural land, and pockets of industrial areas. As rainfall or irrigation water in these watershed moves downstream, it picks up a variety of contaminants. Offshore areas of the Sanctuary are in relatively good condition, but nearshore coastal areas, harbors, lagoons, estuaries and tributaries show a number of problems including elevated levels of coliform bacteria, detergents, oils, nitrates, sediments, and persistent pesticides such as

DDT and toxaphene. These contaminants can have a variety of biological impacts including bioaccumulation, reduced recruitment of anadramous species, algal blooms, transfer of human pathogens and interference with recreational uses of the sanctuary due to beach closures. For more information, visit the website at:http://www.mbnms.nos.noaa.gov/resourcepro/resmanissues/issues.html or contact Chris Coburn at 831-420-1630.

- **Wildlife Disturbance Program**
  The Sanctuary provides many opportunities for observation of nature, including whale watching, bird watching, pinniped pupping and haulout activity, and viewing of sea otters. Rocky shorelines provide pedestrians opportunities to view the flora and fauna associated with the intertidal habitat, and kayaks and partyboats are used for nearshore and offshore tours. With the multitude of opportunities for observation come the potential for wildlife disturbance that may result in flushing birds from their nesting roosts, harassment or even death of pinnipeds or sea otters, as well as trampling and excess collecting of intertidal organisms. Other sources of wildlife disturbance include low-flying aircraft and fireworks displays that can flush seabirds and marine mammals and marine personal watercraft. For more information, visit the website at: http://www.mbnms.nos.noaa.gov/resourcepro/resmanissues/issues.html or contact Seaberry Nachbar at 831-647-4201.

- **Invasive Species Program**
  Invasions by non-native aquatic species are increasingly common worldwide in coastal habitats. Estuaries, in particular, harbor large numbers of introduced species. For example, there are about 250 known invasive species in the San Francisco Bay and Delta. Within Sanctuary waters, there are approximately 40 invasive species in Elkhorn Slough, and another small handful of species recently reported in nearshore coastal waters. Known reports of invasive species have been summarized for the Sanctuary region. However, there has not been a systematic survey of nearshore coastal waters to evaluate the level of invasive species present. For more information, visit the website at: http://www.mbnms.nos.noaa.gov/resourcepro/resmanissues/issues.html or contact Seaberry Nachbar at 831-647-4201.

- **National Marine Sanctuary Education Activities**
  The National Marine Sanctuaries Act of 1972 that established our nation's marine sanctuaries set forth several specific national goals. Science and education were two critically important goals identified in the Act. Guided by these legislative goals, the national program and field offices have evolved major scientific and education programs and activities over the past two decades. Educational activities from the various sanctuary programs can be found at this web site: http://www.sanctuaries.nos.noaa.gov/scied/scied.html

- **The Land-Sea Connection: A Teacher Curriculum**
  This teacher curriculum was developed to complement a new full-color, bathymetric and topographic map of the Monterey Bay National Marine Sanctuary (information about the map can be found at http://www.mbnmsf.org/pages/sanctuarymap.html) and to help

students increase their understanding of science and geography. This curriculum also introduces students to the excitement of real-time underwater exploration with a research mission called Sustainable Seas Expeditions (SSE)on the Internet. The authors of this curriculum recommend using the SSE Teacher Resource Book as it contains many more ideas and activities for enriching and supplementing your science curriculum: www.sanctuaries.nos.noaa.gov/special/special.html#TeacherBook.

- **"La Conexión de Mar y Tierra" (The Land-Sea Connection: A Teacher Curriculum)**
  This is a Spanish translation of the teacher curriculum of The Land-Sea Connection, which was developed to complement a new full-color, bathymetric and topographic map of the Monterey Bay National Marine Sanctuary (information about the map can be found at http://www.mbnmsf.org/pages/sanctuarymap.html) and to help students increase their understanding of science and geography. For more information visit the website at: bonita.mbnms.nos.noaa.gov/Educate/teachercurriculumspanish/welcome.html

Other Links:

- **Ocean Explorer**
  The Deep East 2001 Voyage of Discovery: Classroom teachers working with NOAA during July 2001 developed a series of lesson plans for students in Grades 5 – 12 that are specifically tied to the Deep East 2001 Voyage of Discovery. These lesson plans focus on cutting-edge ocean exploration and research, using state-of-the-art technology, aboard one of the nation's most sophisticated research vessels, the R/V Atlantis and its submersible Alvin. The lesson plans focus specifically on the importance of ocean exploration and the research taking place during the Deep East 2001 Voyage of Discovery, and feature such topics as deep-sea corals off George's Bank, biodiversity and materials transport at the Hudson Canyon, and gas hydrates on the Blake Ridge. The lesson plans were developed for Grades 5-6, Grades 7-8, and Grades 9-12 (chemical, biological, earth, and physical science). For more information, visit the website at: http://oceanexplorer.noaa.gov/explorations/deepeast01/background/education.html

- **Science with NOAA Research**
  This web page provides middle school science students and teachers with research and investigation experiences using on-line resources. Teachers will find information that will help them prepare students for investigating the various sites in this program. Even if the teacher does not have much experience in using web-based activities in science classes, the directions are easy to follow. Topics include ocean temperatures, currents, fisheries, and the Great Lakes. For more information visit the website at: www.oar.noaa.gov/k12/

- **A Resource for Teachers**
  This resource guide, originally developed as part of the 125th Anniversary activities for the National Marine Fisheries Service, can be used in the classroom for students K-12. The packet includes 48 marine fisheries and marine resources worksheets or outlines

(plus answer sheets) which can be photocopied. For more information please visit the website at: www.afsc.noaa.gov/sep/ResGuide_framed.htm

- **NOAA's Resource Guide for Teachers of Marine Science**
  This resource guide was prepared by staff of the National Marine Fisheries Service to provide a guide on Coastal Awareness in Science for elementary, junior high and high school science teachers. Its purpose is to promote the exploration of ecology and coastal awareness. The guide is divided into a reference to books at the elementary, middle, and high school levels; as well as a section on teacher resources with curriculum guides, lesson plans, bibliographic collections, etc. and audiovisual materials for all age levels, includes CD-ROM, Film and Video. This guide can also be found in a .pdf format at noaabibl.pdf. For more information please visit the website at: http://swfsc.ucsd.edu/bibliography/GUIDE.htm

- **Tales of Whales, Turtles, Sharks, and Snails: An Elementary Level Education Handbook**
  This is a marine study guide for Grades 4-6. The purpose of this publication is to increase the awareness, knowledge and literacy of elementary students in marine-related subjects Also, it's not necessary to be in proximity to a coastal environment in order to benefit from the activities presented in this handbook. For more information visit the website at: http://www.graysreef.nos.noaa.gov/tw.html